Installation Instructions

DeviceNet RS-232 Interface Module

(Catalog Number 1770-KFD and 1770-KFDG)

To the Installer

The 1770-KFD module is a portable RS-232 communication interface that provides a host computer access to a DeviceNet™ network.

This document contains this information:

topic	page
purpose and audience	2
precautionary statements	2
handling the module	4
terminology	4
related publications	4
contents of your order	5
introduction to the RS-232 module	8
communicating on DeviceNet	9
mounting the module	10
supplying power	12
connecting cables via RS-232 to a computer	14
connecting cables via RS-232 to a modem	16
connecting cables via DeviceNet	17
installing the 1770-KFD driver	22
interpreting status indicators	23
specifications	25
support services	26

New or modified information is highlighted by a revision bar.

Publication 1770-5.6 – June 1996

Purpose

Use this document to learn how to install and use the DeviceNet RS-232 interface module.

Audience

Read this manual before you install or use the DeviceNet RS-232 interface module. You should be familiar with DeviceNet technology.

Precautionary Statements

Important User Information

Because of the variety of uses for the products described in this publication, those responsible for the application and use of this control equipment must satisfy themselves that all necessary steps have been taken to assure that each application and use meets all performance and safety requirements, including any applicable laws, regulations, codes and standards.

The illustrations, charts, sample programs and layout examples shown in this guide are intended solely for purposes of example. Since there are many variables and requirements associated with any particular installation, Allen-Bradley does not assume responsibility or liability (to include intellectual property liability) for actual use based upon the examples shown in this publication.

Allen-Bradley publication SGI-1.1, *Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control* (available from your local Allen-Bradley office), describes some important differences between solid-state equipment and electromechanical devices that should be taken into consideration when applying products such as those described in this publication.

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Throughout this document we use notes to make you aware of safety considerations:

ATTENTION: This notation identifies information about practices or circumstances that can lead to personal injury or death, property damage or economic loss.

Attention statements help you to:

- identify a hazard
- avoid the hazard
- recognize the consequences

Important: This notation identifies information that is critical for successful application and understanding of the product.

European Union Directive Compliance

This product has the CE mark and is approved for installation within the European Union and EEA regions. It has been designed and tested to meet the following directives.

EMC Directive: This apparatus is tested to meet Council Directive 89/336/EEC Electromagnetic Compatibility (EMC) using a technical construction file and the following standards, in whole or in part:

- EN 50081-2 EMC – Generic Emission Standard, Part 2 – Industrial Environment
- EN 50082-2 EMC – Generic Immunity Standard, Part 2 – Industrial Environment

The product described in this manual is intended for use in an industrial environment.

Low Voltage Directive: This apparatus is also designed to meet Council Directive 73/23/EEC Low Voltage, by applying the safety requirements of EN 61131-2 Programmable Controllers, Part 2 – Equipment Requirements and Tests.

For specific information that the above norm requires, see the appropriate sections in this manual, as well as the following Allen-Bradley publications:

- Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1
- Guidelines for Handling Lithium Batteries, publication AG-5.4
- Automation Systems Catalog, publication B111

Handling the Module

ATTENTION: This RS-232 module uses CMOS technology, which is highly sensitive to electrostatic discharge (ESD). ESD may be present whenever you are handling the module.

Take these precautions to guard against electrostatic damage:

- Avoid touching the interface connector pins on the RS-232 module.
- If the module is not in use, store it in the anti-static bag in which it was shipped.

It is not necessary to wear an ESD wrist strap while handling the 1770-KFD module.

Terminology

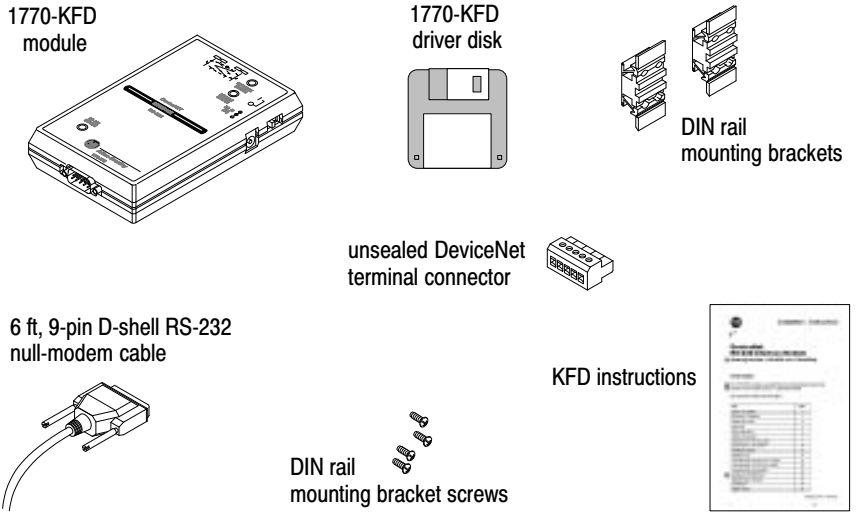
this term	means
DeviceNet	an open communication network designed to connect control systems to plant floor devices, e.g., sensors, push buttons, motor starters, and drives DeviceNet is based on commercially available technology and can be used by any company to develop interoperable products.
node configuration	to configure the node address and data rate before a device is connected to a DeviceNet network
parameter configuration	to configure the operational parameters of a DeviceNet device
point-to-point configuration	a two-node DeviceNet network consisting of a 1770-KFD interface module and a device

Related Publications

title	publication number
DeviceNet Manager Software User Manual	1787-6.5.3
DeviceNet Cable System Planning & Installation Manual	DN-6.7.1
DeviceNet RS-232 Interface Module Communication Protocol Reference Manual	1770-6.5.22

Contents of Your 1770-KFD Order

With this package you should receive:



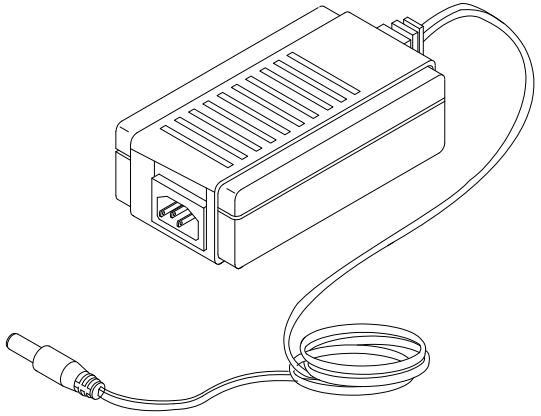
- one DeviceNet RS-232 interface module, catalog no. 1770-KFD
- one 1770-KFD driver diskette
- two DIN rail mounting brackets
- four DIN rail mounting bracket screws
- one 6 ft, 9-pin D-shell RS-232 null-modem cable
- one unsealed DeviceNet terminal connector
- one copy of publication 1770-5.6, DeviceNet RS-232 Interface Module Installation Instructions

If you ordered catalog no. 1770-KFDG, your order also includes a global 9V ac power supply adapter (90 – 260V ac).

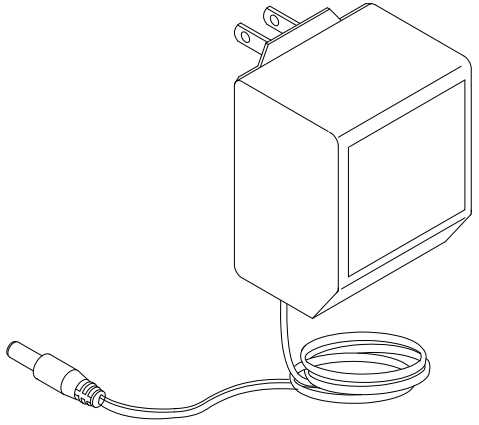
If you are missing any of these pieces, contact your Allen-Bradley sales representative.

Available options:

- global 9V ac power supply adapter (90 – 260V ac), *which comes with catalog no. 1770KFDG/A*

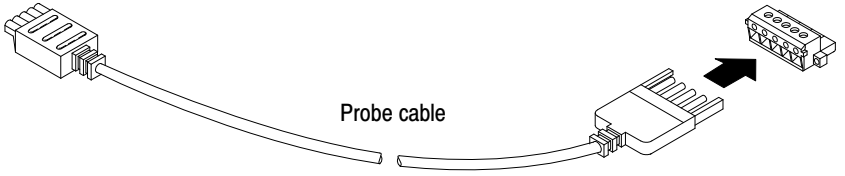


- domestic 9V ac power supply adapter (120V ac), *which you can order separately as catalog no. 1787USADPTR/A*

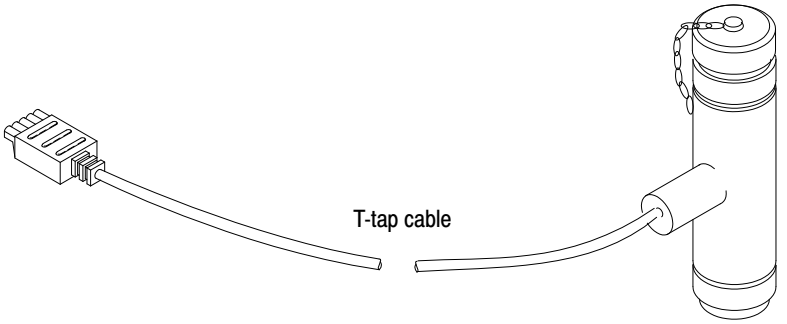


Each adapter connects to the power supply connector on the 1770-KFD module. See page 12 for additional information.

- an 8 ft, 5-pin DeviceNet unsealed probe cable (catalog no. 1787-PCABL), *which you can order separately*

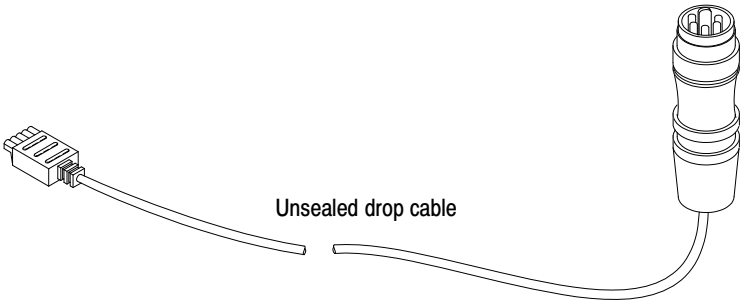


- a 6 ft, sealed T-tap DeviceNet connector cable (catalog no. 1787-TCABL), *which you can order separately*



This cable connection lets the 1770-KFD module and a device connected to the module in a point-to-point configuration draw power from the network.

- a 6 ft, unsealed-to-sealed DeviceNet drop cable (catalog no. 1787-MCABL), *which you can order separately*



Each cable connects to the 5-pin unsealed receptacle on the 1770-KFD module. See cable connection information beginning on page 17.

Introducing the 1770-KFD Interface Module

The 1770-KFD module, described in Figure 1, is a portable RS-232 communication interface that provides a host computer access to a DeviceNet network.

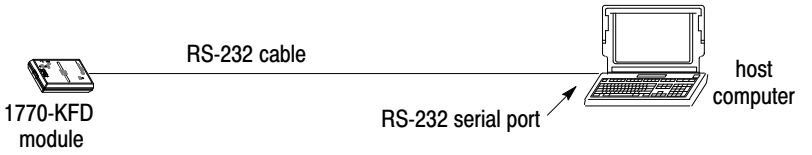
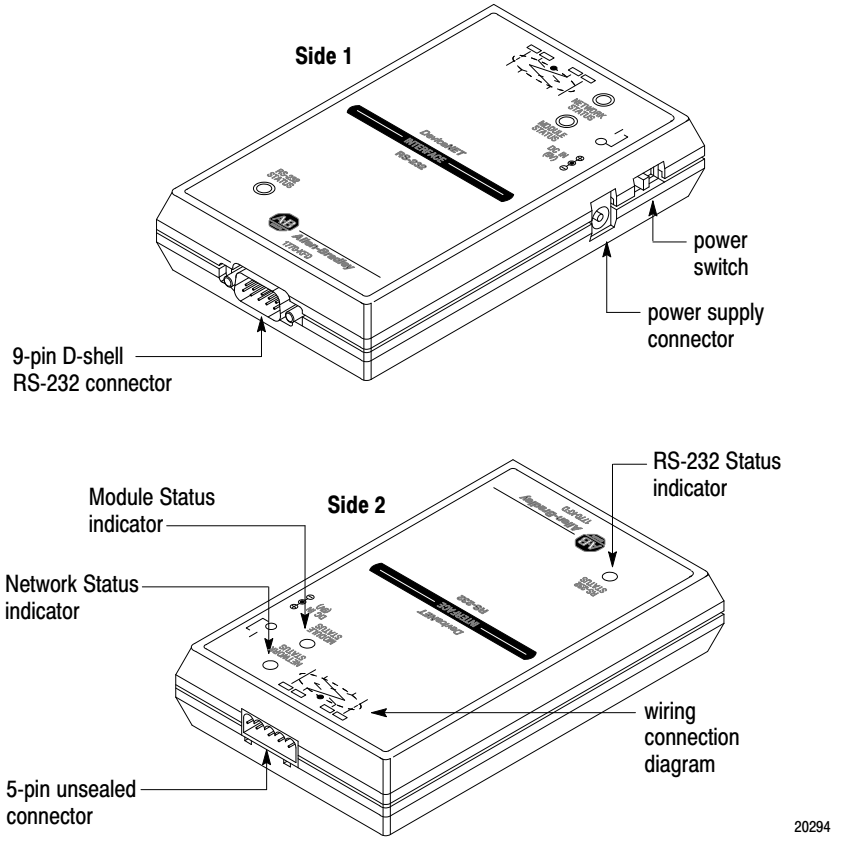


Figure 1
1770-KFD module

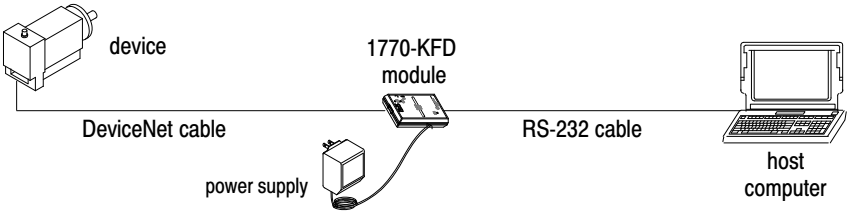


Communicating on DeviceNet

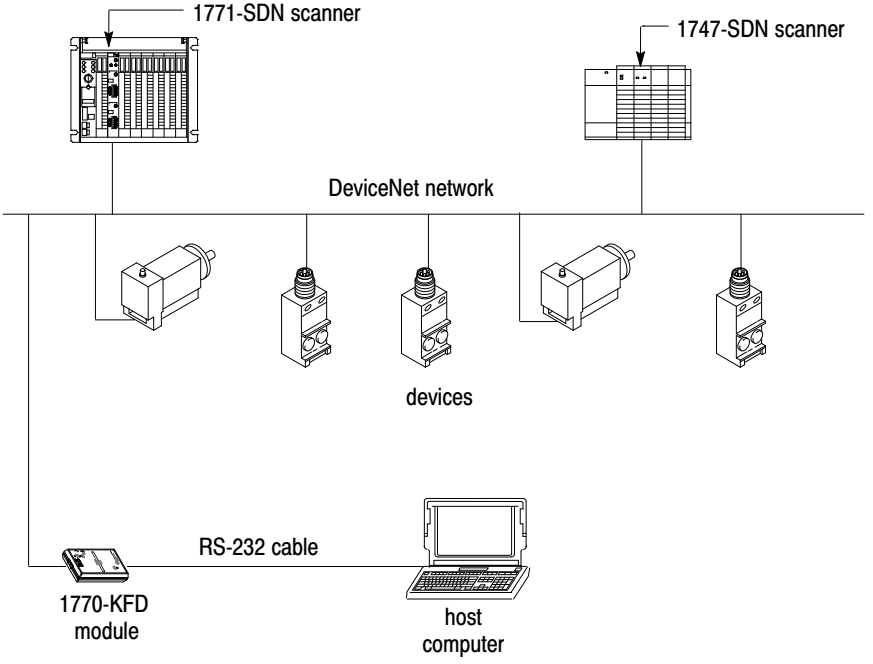
The 1770-KFD module lets you communicate:

- point-to-point (host computer directly to device via the 1770-KFD module)

  The host computer uses a point-to-point connection for node and/or parameter configuration.



- via a DeviceNet network connection



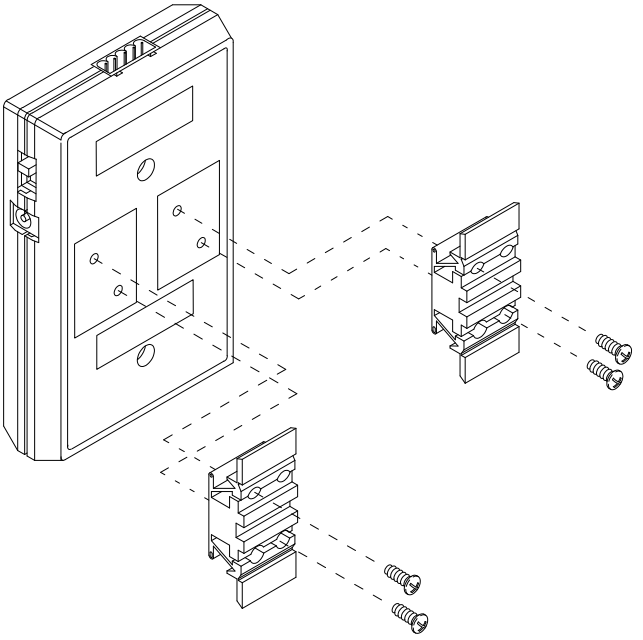
The 1770-KFD module performs data transmission, management, and local network diagnostics.

Allen-Bradley DeviceNet Manager software, 1787-MGR, manages data transmission and reception through the 1770-KFD interface module from a personal computer (Windows™ operating system).

Mounting the 1770-KFD Module

You can mount the module on a DIN rail.

1. Use the four screws to attach the two mounting brackets to the back of the module.



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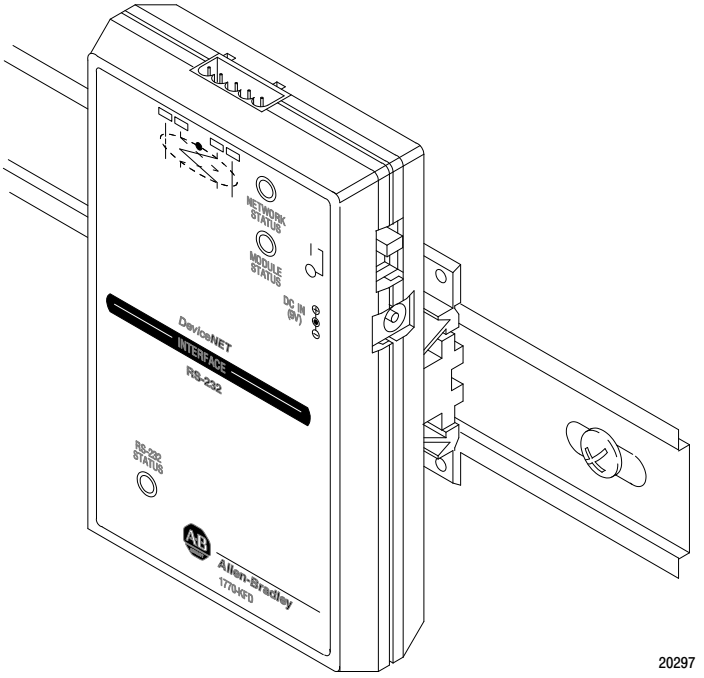
2. Snap the mounting brackets onto the DIN rail.



Supplying Power to the 1770-KFD Module

The 1770-KFD module can be powered from either an external power supply or from a DeviceNet network.

Supplying Power via AC Wall Adapter

Figure 2 shows the power supply, catalog no. 1787-USADPTR, that takes 120V ac and outputs 9V dc at 1 amp.

Figure 2
Domestic 9V ac wall adapter

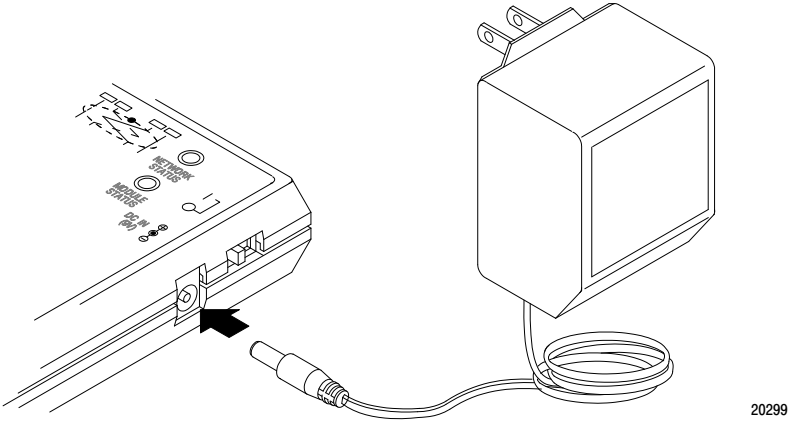
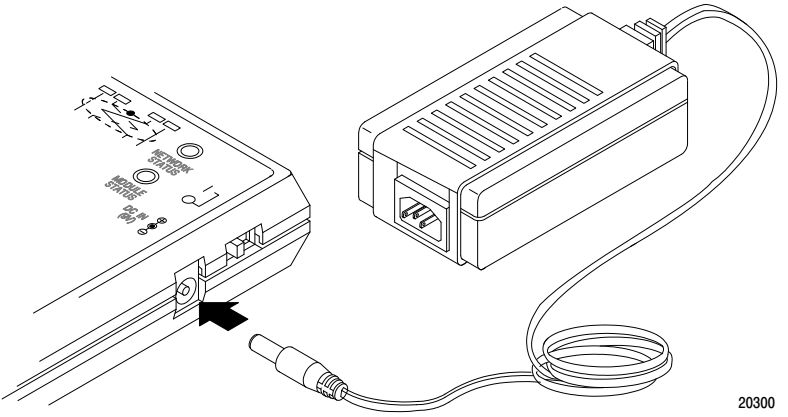


Figure 3 shows the global power supply, which takes 90 – 260V ac, 47 – 63 Hz, and outputs 9V dc. This power supply is available only with the 1770-KFD module as catalog no. 1770-KFDG.

Figure 3
Global 9V ac wall adapter



Important: You **must** supply the cable between the adapter and the outlet.

Supplying Power via Network

The DeviceNet network can power the 1770-KFD module.

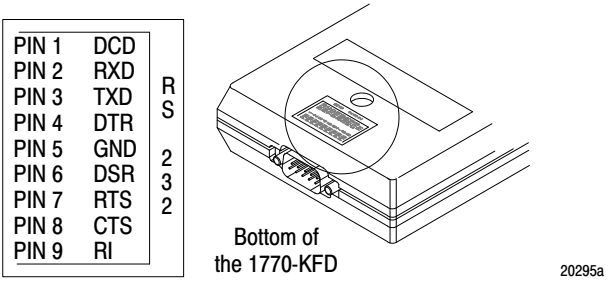
Important: When the module is connected to a powered DeviceNet network, the network connection *overrides* the external power supply.

Supplying Power to a Device

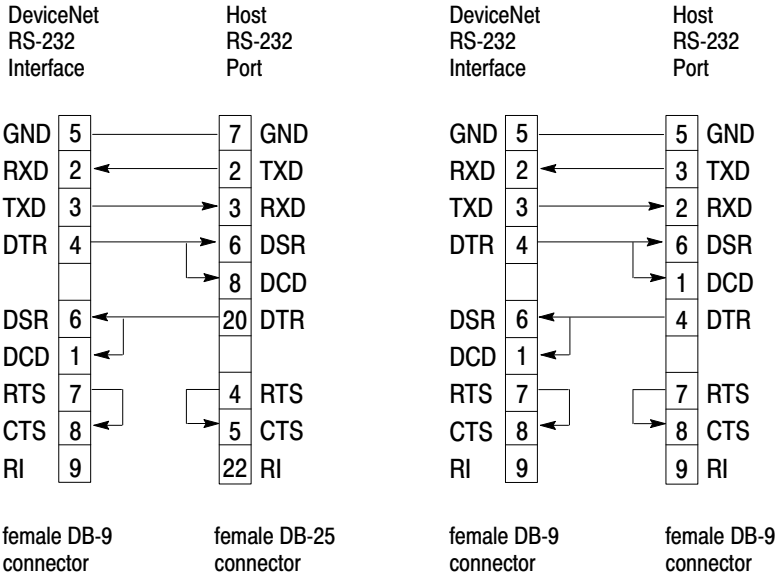
The module can supply power to a device in a point-to-point connection. The device being powered in a point-to-point connection can draw a maximum of 100 mA at 12V dc ±5%.

Connecting Cables via RS-232 to a Computer

Use the wiring key molded on the bottom of the 1770-KFD module when connecting the RS-232 cable to a computer.



Use these wiring configurations:



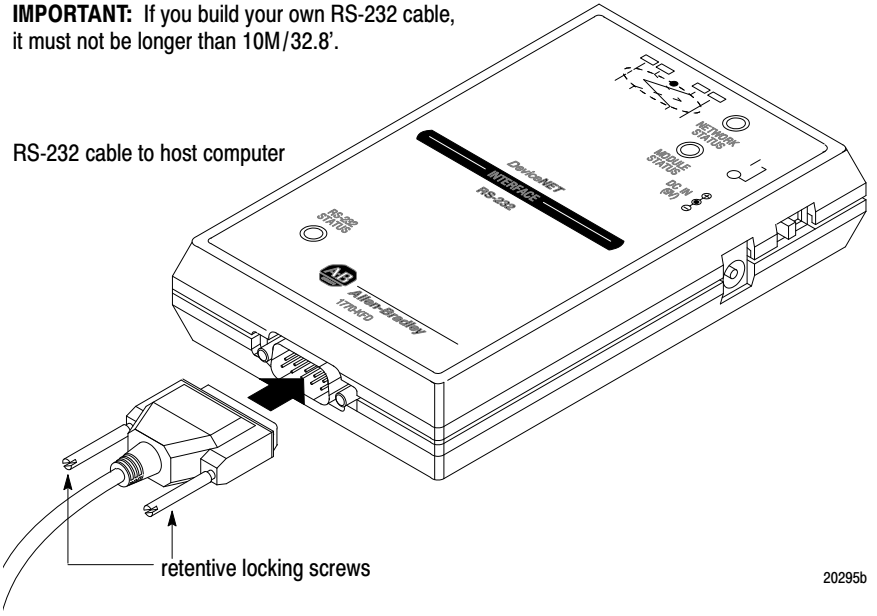
RS-232 Cable Connections (via 9-pin serial port connector)

These pin numbers correspond with these connections:

pin number	abbreviation	description	direction
1	DCD	data carrier detect	in
2	RXD	receive data	in
3	TXD	transmit data	out
4	DTR	data terminal ready	out
5	GND	signal ground	–
6	DSR	data set ready	in
7	RTS	request to send	out
8	CTS	clear to send	in
9	RI	ring indicator	in

Connect the 1770-KFD module to a computer by using the RS-232 cable.

IMPORTANT: If you build your own RS-232 cable, it must not be longer than 10M/32.8'.



Using the Interface Module with a Portable Computer

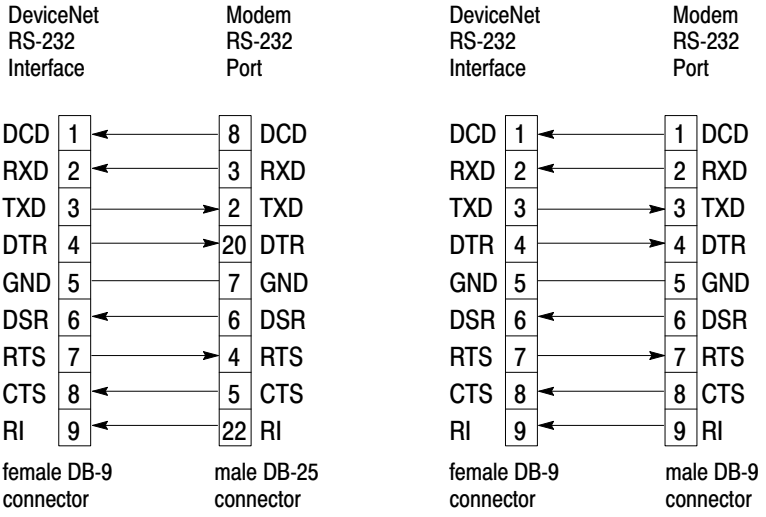
Some portable computers have power-saving modes that power down the serial ports during inactive periods, occurring most often when batteries power the PC. The serial-port power-saving feature causes the RS-232 interface module to go offline and to cease communication with DeviceNet Manager. You should disable the serial-port power-saving feature to use the RS-232 interface module with DeviceNet Manager.

If you experience a problem with the RS-232 interface module going offline unexpectedly, use the setup program of your portable computer to disable the serial-port power-saving feature.

Connecting Cables via RS-232 to a Modem

You can connect a 1770-KFD module to these standard dial-up modems:

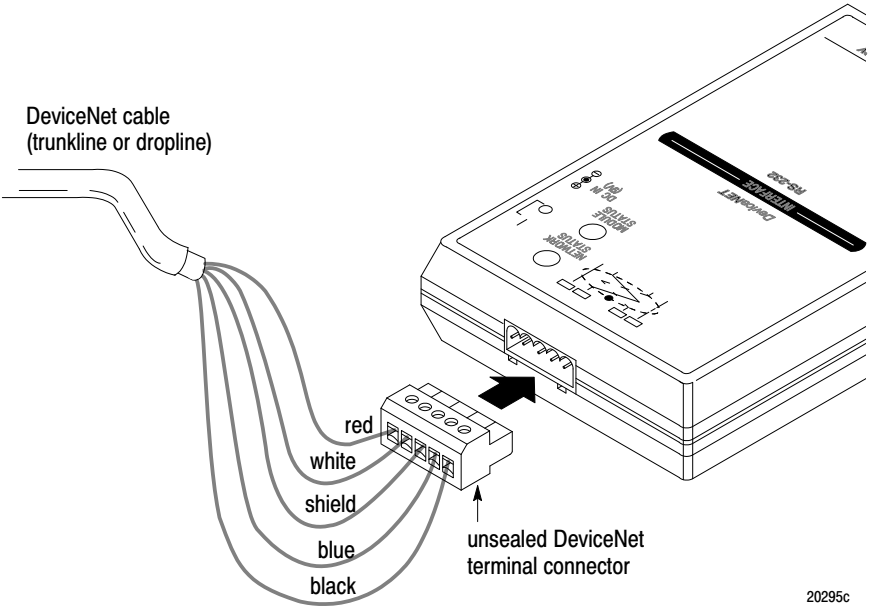
- DTE-controlled answer
- auto-answer



Connecting Cables via DeviceNet

Follow these steps to connect the 1770-KFD module to a DeviceNet network:

1. Connect the DeviceNet cable (trunkline or dropline) to the unsealed DeviceNet terminal connector.



2. Connect the terminal connector to the 1770-KFD module.

Important: DeviceNet cable connections should match color bars/electrical diagram on top of 1770-KFD module. See the table below.

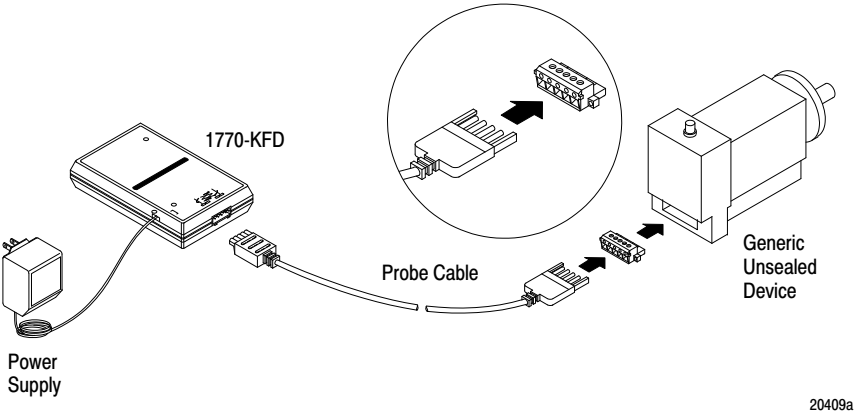
pin number	wire color	abbreviation	description
1	black	V–	power return
2	blue	data low	data line
3	clear	shield	between cable jacket and wire
4	white	data high	data line
5	red	V+	positive voltage (hot)

Connecting the 1770-KFD Module to DeviceNet Devices (Point-to-Point)

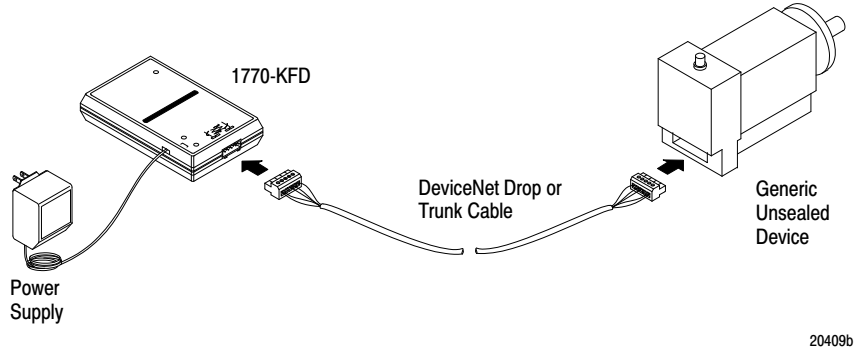
You can connect the module to a sealed or an unsealed device in a point-to-point configuration.

Connect to an **unsealed device** in one of two ways:

- use a 1787-PCABL probe cable

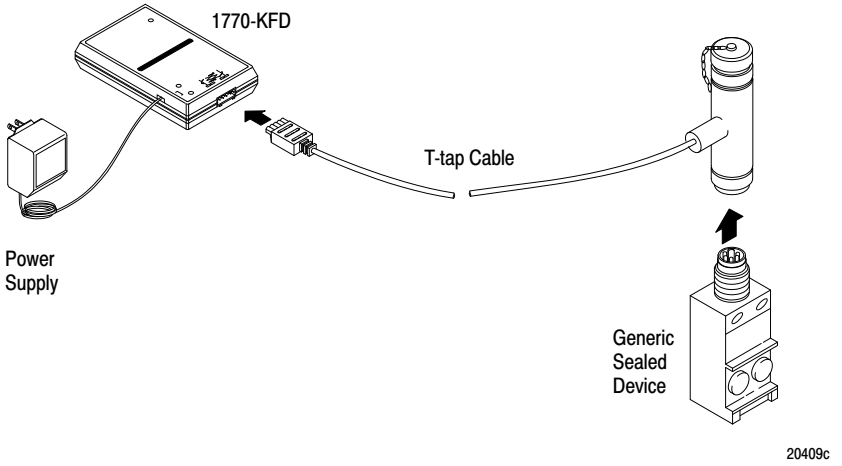


- use DeviceNet drop or trunk cable

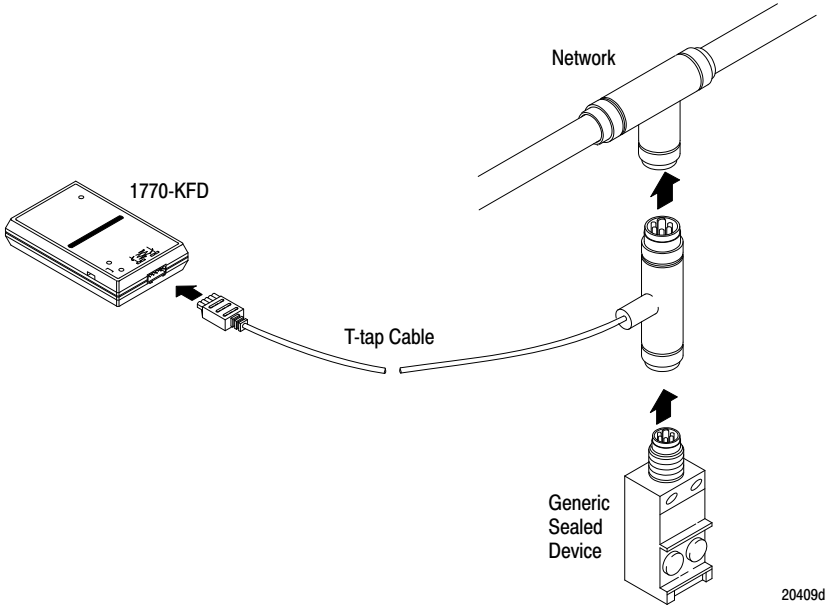


Connect to a **sealed device** in one of three ways:

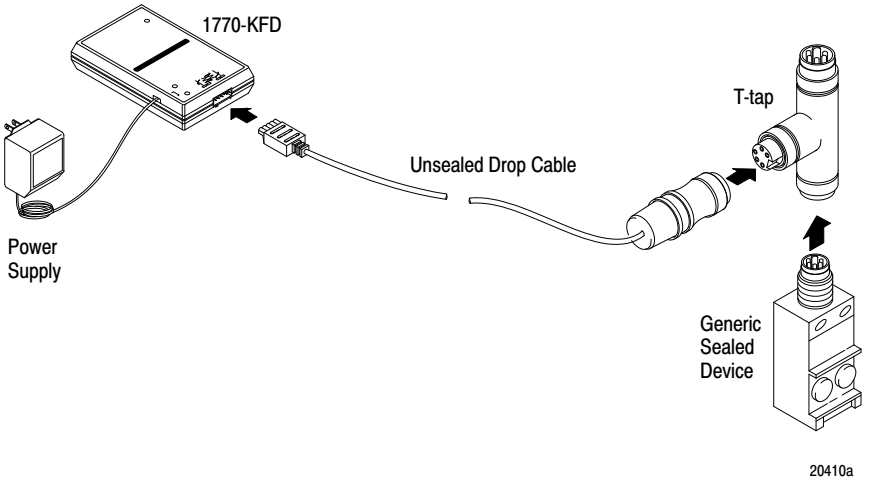
- use a 1787-TCABL T-tap cable (and power supply)



- use a 1787-TCABL T-tap cable (and draw power from the network)



- use a 1787-MCABL unsealed drop cable (and power supply)

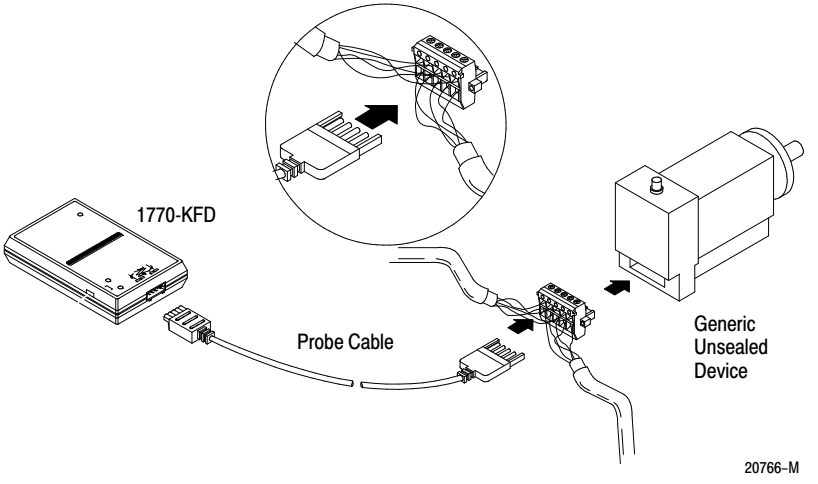


Probing a Network

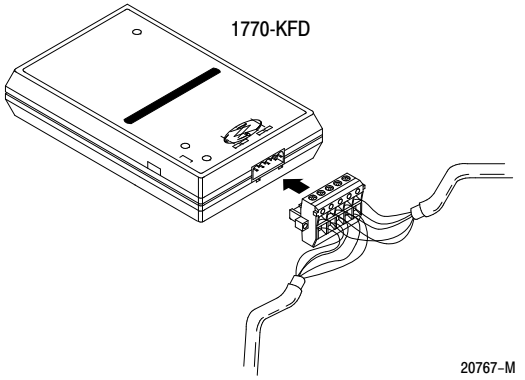
You can probe a sealed or an unsealed network with the 1770-KFD module.

Probe an **unsealed network** in one of two ways:

- use a 1787-PCABL probe cable

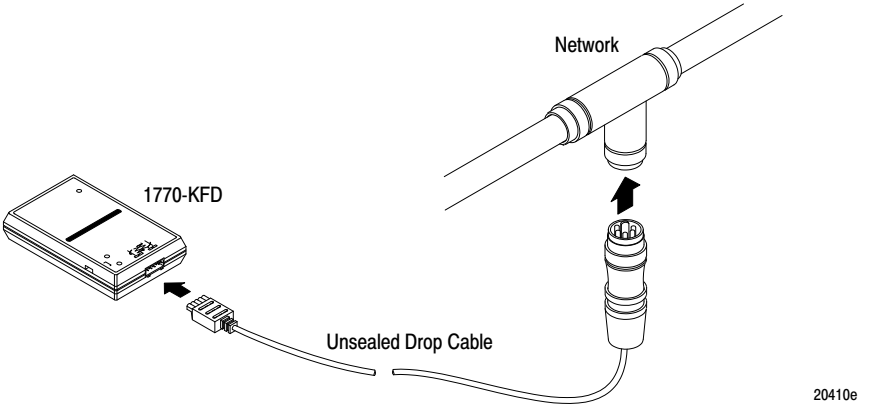


- use a DeviceNet terminal connector



Probe a **sealed network** in this way:

- use a 1787-MCABL unsealed drop cable



Installing the 1770-KFD Driver

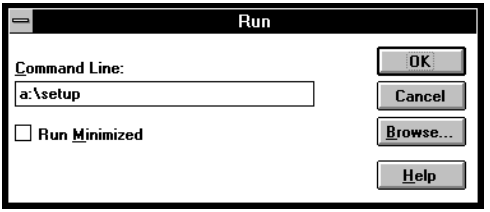
If you are using a WinDNet™-compatible application, you must install the 1770-KFD driver.

Follow these steps:

1. Start Windows 3.1, Windows 95, or Windows NT.
2. Select Run from the File menu.
3. On the command line, type

   ```
   a:\setup
   ```

   as shown here:



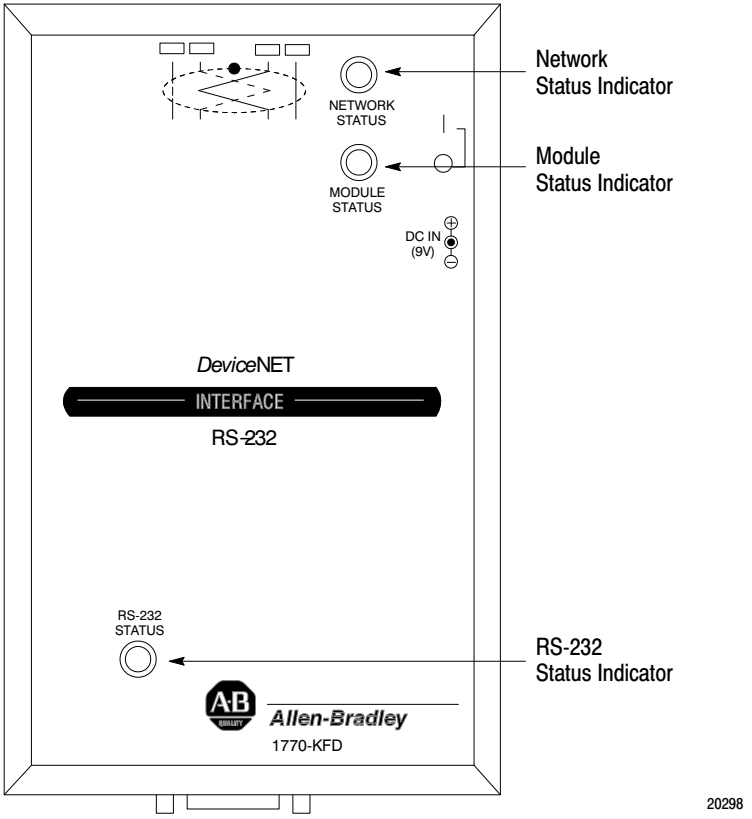
4. Press OK.
5. Follow the instructions in each dialog box until you see the message:

   ```
   Installation Complete
   ```

Interpreting Status Indicators

The three status indicators on the module give you information about your network and its connections. Figure 4 identifies each status indicator.

Figure 4
Status indicator locations



The tables on page 24 outline the indicator condition and the corresponding status, and explain what each condition means to you.

Module Status Indicator

condition	status	indicates
off	no power	no power applied to device
solid green	device OK	device is operating in normal condition; KFD module is on line, i.e., has baud rate detected
flashing green	not configured	device is operating in normal condition; waiting for initialization from host (in 'autobaud' mode)
solid red	critical fault	device has unrecoverable fault; replace it
flashing red	non-critical fault	device has recoverable fault; to recover: • reconfigure device • reset device • perform error recovery

Network Status Indicator

condition	status	indicates
off	off line	KFD DeviceNet is off line
flashing green	on line	KFD DeviceNet is on line, but not communicating
solid red	link failed (critical)	device has detected an error that has rendered it incapable of communicating on the link; for example, detected a duplicate node address or network configuration error
solid green	on line, communicating	data being transmitted or received

RS-232 Status Indicator

condition	status	indicates
off	no activity, link OK	no communication activity
flickering green	activity, link OK	data being transmitted or received
solid red	link failed (critical)	device has detected an error that has rendered it incapable of communicating of the link
flashing red	link failed (non-critical)	device has detected recoverable fault; for example, detected an incorrect baud rate or parity error

Specifications

communication rate	RS-232 selectable rates: • 1200 baud 19,200 baud • 2400 38,400 • 4800 57,600 • 9600 DeviceNet selectable rates: • 125K baud • 250K • 500K
function	to monitor and configure devices on DeviceNet network
location	anywhere via personal computer
communication port	one 9-pin RS-232 D-shell
cabling	RS-232 cable; see cable diagrams
power requirements:	
• ac wall	9V @ 1 amp
• DeviceNet connector	11 – 25V @ (700mA – 300mA)
ambient temperature rating:	
• operational	0 to 50°C (32° to 122°F)
• storage	–40°C to 85°C (–40° to 185°F)
ambient humidity rating	5% – 95%
physical:	
• size	5.125 x 3.25 x 1.125 in. (13.017 x 8.255 x 2.857 cm)
• weight	5.5 oz (156 gm)
Agency Certification (when product or packaging is marked)	• CSA certified • CSA Class I, Division 2 Groups A, B, C, D certified • UL listed • CE marked for all applicable directives

Support Services

At Allen-Bradley, customer service means experienced representatives at Customer Support Centers in key cities throughout the world for sales, service, and support. Our value-added services include:

Technical Support

- SupportPlus programs
- telephone support and 24-hour emergency hotline
- software and documentation updates
- technical subscription services

Engineering and Field Services

- application engineering assistance
- integration and start-up assistance
- field service
- maintenance support

Technical Training

- lecture and lab courses
- self-paced computer and video-based training
- job aids and workstations
- training needs analysis

Repair and Exchange Services

- your only “authorized” source
- current revisions and enhancements
- worldwide exchange inventory
- local support